Graduate Seminar on Algorithms in Real Algebraic Geometry

Prof. Dr. Nitin Saxena

Sommersemester 2012: From Thursday, 12th April 2012.
Monday/Thursday 1400-1600, N0.008 (Neubau), Endenicher Allee 60.

Background:
Students who are aware of the basics of computation and basic algebra will find the seminar especially interesting.

Outline:
This seminar will study some basic and advanced topics in computational algebra and geometry. The focus will be on understanding the key ideas behind algorithms without getting too much into the implementation details.
The students are encouraged to present at least two lectures during the semester. Some topics to choose from are given below (see Reference). To send your choices or to ask for more details contact `ns@hcm.uni-bonn.de` or `peter.scheiblechner@hcm.uni-bonn.de`

- Quantifier elimination: Algebraically (or real) closed fields
- Elements of algebra
- Decomposition of semi-algebraic sets
- Elements of topology
- Morse theory: Computing Betti numbers
- Cauchy index: Root counting applications
- Computing real roots
- Cylindrical decomposition
- Computing Euler-Poincaré characteristic

Reference -
1) *Algorithms in Real Algebraic Geometry*, Second Edition, by Saugata Basu, Richard Pollack, Marie-Françoise Roy.
`http://perso.univ-rennes1.fr/marie-francoise.roy/bpr-ed2-posted2.html`